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Ontario Department of Agriculture

TOMATOES

A. G. TURNEY.

About the beginning of last August I was appointed to investigate the tomato industry of this Province. The investigation is simply the result of inquiry and observation, and has nothing to do whatever with practical experience. I will first give you an idea of the extent of the industry as I find it in this Province. By far the larger area is devoted to producing tomatoes for the canning factories. In 1891 there were about 800 cars of canned goods shipped; last year this increased to about 8,000; from 1904 there was approximately 3,000, so that it has increased 5,000 cars in the last five years.

HISTORY.

The tomato plant is of South American origin, and was apparently cultivated there for many years prior to the discovery of the country by Europeans. As early as 1554 we find that in Europe certain varieties of tomatoes had been described. From that year to 1860, fifteen distinct varieties were described and we have records of tomatoes being successfully produced under glass in Europe in 1820.

The first mention on this continent of the tomato being grown for culinary use was in Virginia in 1781. During the following twenty years futile attempts were made to popularize the use of the fruit. However, it is on record that the fruit was regularly quoted on the market in New Orleans in 1812, and that the seed was first offered for sale as that of an "edible vegetable" six years later. From that time on the increase in its popularity and culture has gradually proceeded, until to-day the tomato ranks with the more common fruits found on the markets of this continent, either in the natural or canned state. But while the majority of these more common fruits have been in great demand for some decades past, yet the same cannot be said for the tomato, for it is only during the last few years that it has assumed such a prominent place in the list of necessary articles of food.

RECENT GROWTH OF THE INDUSTRY.

By far the larger portion of the area devoted to the crop is employed in supplying fruit for the canning factories, and it is the demand of these canning factories which more than any other factor has, during the past few years, supplied the great impetus to tomato culture.

As an article of trade canned tomatoes were first introduced on this continent in 1848, by Harrison W. Crosby, Steward of the Lafayette College, Easton, Pa. The cost then was fifty cents per can. Since that time the cost of producing the finished article has decreased steadily, whilst the output has increased enormously, and to-day three-lb. cans of tomatoes can be bought retail for nine and ten cents.

Some idea of the increase in the extent of the business during the past few years in the United States and Ontario may be obtained from the following record of the total output in cases of twenty-four 3-lb. cases:

<i>United States.</i>		<i>Ontario</i>	
1887	2,800,000	1887	
1891	3,322,000	1891	83,000
1892	3,223,000	1892	144,000
1903	10,500,000	1904	310,000
1906		1906	793,000
1907	13,000,000	1907	575,000
1908		1908	875,000

A still better idea of the growth of the industry in Ontario may be obtained from the following statements: The acreage under production for the canning factories has increased from 800 in 1891 to approximately 8,000 in 1908. For the same period, the total number of bushels paid for by the canning factories has increased from 132,000 to 1,400,000, the cases from 83,000 to 880,000, the cans from 1,992,000 to 21,124,000, the value of the pack from \$190,000 to \$1,672,000, and the price paid to the growers from \$26,400 to \$386,600; and during the past five years the number of factories packing tomatoes has increased from twenty-seven to fifty-three.

THE PRODUCTION OF CANNED TOMATOES.

In Ontario the canning of tomatoes upon a commercial basis dates back some twenty-seven years. In 1881, Messrs. Wellington Boulter and Gilbert Barker erected and started into operation canning factories at Picton and Bloomfield in the county of Prince Edward. To these men, then, belongs the credit of pioneering an industry which, in the comparatively short period of a quarter of a century has made such a remarkably rapid growth.

The districts in this Province producing canning tomatoes, or what is commonly known as the main crop, naturally fall into four districts, viz.: Prince Edward County, which is practically an island on Lake

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A typical Earlianna vine.

Ontario; Eastern Ontario, exclusive of Prince Edward County; Western Ontario and Southern Ontario. The following table compiled from 1906 figures will indicate somewhat the comparison between the districts.

District.	Acreage.	Total Yield	Average Yield	Total Cases	Price paid to growers
		Bush.	Bush.		\$
Prince Edward County.....	1,950	414,000	212	245,600	103,500
Eastern Ontario.....	1,135	181,000	159	116,400	45,250
Southern Ontario.....	2,130	464,000	218	290,000	126,000
Western Ontario.....	1,570	237,500	151	142,000	59,375

Note: While 1907 figures are available, that year was a poor one, hence 1906 figures are given.

A glance at the list of factories canning tomatoes will indicate the towns they are situated in. Perhaps it would be well at this point to refer briefly to the features of each district, although there is no vast difference between them.

PRINCE EDWARD COUNTY. Being practically an island, more southerly situated than the rest of Eastern Ontario, and containing considerable areas of sandy and light clay loam of good fertility, this district has become famed for the quality and quantity of its tomatoes. It is the pioneer county in the canning industry of the Province, and to-day boasts of twelve factories, all of which pack tomatoes. With a view to early maturity more seed selection has been practised in this district than in Eastern and Western Ontario and the county boasts of as high an average yield as the famed Niagara district, in 1906 the average going over 200 bushels to the acre. The plants are largely grown by experienced and conscientious greenhouse men and sold to the farmers, hence a better class of plants is produced. This fact, together with more years of experience and more attention to detail largely accounts for the superiority of this district over Eastern and Western Ontario.

EASTERN ONTARIO. This district extends from Napanee to Oshawa, some 100 miles, a length almost equal to that in the Western Ontario district, but on account of its more northerly and eastern situation the area of land suitable and used for tomato growing is confined to the narrow strip on the lake shore and the actual acreage is only one-half of the other districts and supplies but seven factories. In point of average yield it equals Western Ontario, but falls considerably below the other two districts. The causes for this lower yield are attributable to a poorer supply of the young plants; in a few cases to a want of confidence between the grower and the canner leading to slovenly methods, and in general to the growing of the crop upon soils not very favorable to its culture, without any attempt to counteract the disadvantage by special attention to detail. Since the causes for failure apply to all four districts it will be better to deal with them later on under a separate heading. Cutworms have

caused considerable loss to the growers in Eastern Ontario and Prince Edward County.

SOUTHERN ONTARIO. Southern Ontario comprises the district in the neighborhood of Hamilton, together with the strip of land extending from that city to Niagara Falls and lying between the lake shore and the mountain, and also a small section around Dunnville. In point of number of acres grown in conjunction with the average yield it is the first of the four districts. It contains eighteen factories which pack tomatoes, but the number would not be so large except for the presence of abundant fruit. Of the four districts the climate of this one approximates nearer to that of the native home of the tomato; the soil is for the most part very favorable and in many cases where the crop is grown as a filler in newly planted orchards, the soil is exceedingly favorable to the production of a high quality and quantity. As in Prince Edward County, stockier, hardier and better grown plants are used, and more constant cultivation is practised, the result being evidenced in the higher average yield.

WESTERN ONTARIO. This district extends along the line of the G.T.R. from London to Windsor, and includes a number of favorable sections lying to the south between the railroad and the lake shore, the county of Essex and sections around Alvinston in Lambton County, and Dresden in Wallaceburg in the north of Kent County. There are thirteen factories in this district. Many of these are of recent origin and in starting up these factories in new districts the owners had to contract with inexperienced growers, with the result that the average yield is lower than climatic and soil conditions alone would account for. In Southern and Western Ontario cutworms do not appear to have been anything like so formidable as in the Eastern districts.

PRODUCING THE MAIN CROP.

General methods of production followed throughout the Province:—

The young plants are either procured from professional growers at prices ranging from two to ten dollars per thousand, or are grown by the farmer himself. In the first case the seed is started in greenhouses, and the plants grown there the majority of the time, being generally hardened off in cold frames. If grown by the farmer the seed is sown in hotbed and pricked out into cold frames. When about six weeks old the young plants are transferred to the field, the date of this transplanting varying from May 21st to June 12th and depending largely on the business methods of the grower. The soil upon which the crop is to be grown generally receives an application of from eight to twelve loads of well rotted manure, which is usually plowed under in the fall. A number of growers prefer to manure the previous crop and aim to plow both in the fall and spring. If the soil is light and quite porous, most growers work the manure in

from the surface, believing that by so doing they lose less of its fertilizing elements.

In the spring the ground is more or less efficiently worked up with disc and straight toothed harrows. When planting time arrives the field is marked out with a corn-marker usually 4 feet by 4 feet, sometimes 4 feet by 5 feet, 5 feet by 5 feet and $3\frac{1}{2}$ feet by 5 feet. The spade and furrow systems of planting are both used, the former being much more general. Some few hours before the plants are to be taken from the cold frames they are well watered, thus when the time arrives they are cut around with a sharp spade and the soil being fairly moist a good chunk of it adheres to the roots of each plant. In this way they may be transferred to the field with a minimum disturbance of the roots and the least possible wilt. When set in the field if the soil is dry, water is applied, about two quarts per plant.

The growers generally aim to give the first cultivation on the preceding day or within two or three days after setting. The best growers cultivate after heavy rains to prevent baking of the soil and throughout the season will cultivate in all about four times each way, using the spring tooth or other form of one horse cultivator. With few exceptions the crop is only hoed once, this generally being done shortly before the size of the plants renders horse cultivation detrimental. Harvesting lasts from the middle of August to the middle of October. The first pickings being light are gathered in baskets and afterwards placed in bushel crates. Later pickings, when the ripe tomatoes are numerous, are gathered right into crates. The number of crates hauled to the factory at a time depends largely on its proximity and the area under crop.

COST OF PRODUCTION.

It would seem to be one of the first, if not the first, essential of profitable production that the cost of producing the article upon the sale of which we depend for a profit should be definitely known. But it is a well known fact that of the various foods raised for human consumption probably the least is known concerning the cost of producing those crops raised on the ordinary farm. While this may, to some extent, be accounted for by the nature of the business, so largely affected by individual circumstances, yet in the main it must be credited to a lack of application of business principles to practical agriculture. The men to-day growing tomatoes for the canning factories who have kept any reliable track of their cost of production may be counted on the fingers of the two hands. Again, if a grower who has not kept track of the cost of production is pressed to place his estimate on the expense item by item he becomes alarmed at the large account he is running up, and almost invariably places some ridiculous estimate upon certain items, thus lowering the actual cost. From that standpoint he refuses to recede and his estimate therefore loses in reliability.

Of the cost of production of tomatoes, even so great an authority as W. W. Tracey says: "Under usual conditions the growing of an acre of tomatoes and the gathering and marketing of the fruit will cost from \$18 to \$90." From this statement, and from the fact that a host of conditions of the soil, location, labor, and proximity to markets combine to render the cost of producing this crop very variable, it is impossible to quote an estimate, or estimates that will agree with all the different conditions prevailing throughout the Province. It should be plainly borne in mind that the following figures deal with the cost of production as incurred by the ordinary farmer growing tomatoes for the canning factories, as we find them in Prince Edward County, Eastern and Western Ontario and to a lesser extent in Southern Ontario, for in this latter district the price of land often runs considerably higher, and thus the cost of production is increased. (These figures have nothing to do with the cost of raising early tomatoes and do not apply so much to market gardeners. From records kept by a few growers and assuming average conditions to prevail, with the aim of producing at least 400 bushels to the acre, the cost of production would be as follows:—

	Estimate No. 1. <i>W</i>	Estimate No. 2.
	\$ c.	\$ c.
Rent of land	5 00	5 00
Eight two-horse loads manure.....	6 00	6 00
To applying same.....	4 00	2 50
To 250 lbs. fertilizer.....	4 00	4 00
To applying same.....	1 00	1 00
Plowing.....	5 00	3 15
Harrowing.....		
Rolling.....		
Marking.....		
3,000 plants.....	10 00	10 00
Setting plants.....	4 00	4 00
Cultivating 3 times each way:		
1st time.....	3 00	3 50
2nd time.....	2 00	
3rd time.....	1 00	1 00
Hoing once.....	50	50
Pulling weeds.....		
	45 50	40 65

In Estimate No. 1 the cost of a man for one day has been placed at \$1.50, one man and one horse at \$3.75, and a man and team at \$4.00. At the time of season when this labor is required it cannot be obtained for less than the prices quoted. However, many farmers argue that the actual cost is not as great to them, and place their estimate of cost of one man and a horse for a day at \$2, and a man and a team at \$2.50 per day. On this latter basis an estimate, No. 2, is also given, showing the difference it makes to the cost of production and profit.

PROFIT ACCORDING TO ESTIMATE NO. 1.

	200 bushel yield	300 bushel yield	400 bushel yield
Initial cost.....	\$45 50	\$45 50	\$45 50
Cost of picking at 3c. per bushel.....	6 00	9 00	12 00
Cost of hauling at 2½c. per bushel.....	5 00	7 50	10 00
Total cost.....	\$56 50	\$61 00	\$67 50
Amount received at 27½c. per bushel.....	55 00	82 50	110 00
Profit per acre.....	\$1 50*	\$21 50	\$42 50

* Loss

PROFIT ACCORDING TO ESTIMATE NO. 2.

	200 bushel yield	300 bushel yield	400 bushel yield
Initial cost.....	\$40 65	\$40 65	\$40 65
Cost of picking at 3c. per bushel.....	6 00	9 00	12 00
Cost of hauling at 1½c. per bushel.....	3 00	4 50	6 00
Total cost.....	\$49 65	\$54 15	\$58 65
Amount received at 27½c. per bushel.....	55 00	82 50	110 00
Profit per acre.....	\$5 35	\$28 35	\$51 35

There are some sections of the Province, to wit, in portions of southern Ontario and Essex county, where the price of land is higher, manure is more scarce and the crops grown are harder on the soil, thus increasing the items of rent of land and manuring or fertilizing in the estimate of cost of production. Thus in some of these sections referred to the cost of production might approximate to \$75 per acre. It may be argued that the total cost of manuring should not be charged to the crop of tomatoes alone. This may be so, but in order that due allowance may be made, a thorough knowledge of the individual conditions and the rotation of crops practised in each case is necessary.

THE POSSIBILITIES OF THE TOMATO PLANT AND THE COST OF PRODUCTION IN RELATION TO THE PRICE PAID BY THE CANNING FACTORIES.

The average yield of the main crop in this Province is about 175 bushels to the acre. The actual yields vary all the way from 50 to 700 bushels, numbers of growers regularly producing 400 bushel crops. Estimating the cost of production at from forty-five to fifty dollars, then the average yield is bringing the grower no profit whatever. A 300 bushel yield costing to produce \$61 is bringing the growers a profit of \$21.50 per acre. A 400 bushel yield at the estimated cost of production of \$67.50 is bringing a profit per acre of \$42.50. Now the growers claim that the present price paid, viz., 27½c. per bushel of 60 lbs., is not enough, whilst the canners stoutly affirm that it is more than they can afford. The profits quoted are being obtained by men who are producing as other crops beside tomatoes, grains, roots, corn and potatoes.



Plentiful. Pink variety.

The following table gives some idea how the profit obtained per acre from these different crops compares with those obtained from tomatoes:—

Crop.	Fair yield in bushels.	Price	Value	Cost of Production	Profit
Fall wheat.....	30	\$0.94	\$28 20	Since the cost of production for these crops is not definitely known, the profit from the yield of tomatoes compares very favorably with the total value of the yield per acre of the other crops.	\$42 50
Barley	34	.55	19 25		
Oats	45	.30	18 00		
Peas	20	.87	17 40		
Beans	20	1.75	35 00		
Corn (in ear).....	85				
Potatoes.....	150	.75	112 50		
Turnips	350	.10	35 00		
Tomatoes.....	400	.27½	110 00	\$67 50	

It is thus clearly seen how favorably the tomato crop grown on the ordinary farm in canning districts compares with the other crops. Even as far east as Prince Edward County a number of growers have expressed their firm belief that the tomato is their best paying and surest crop. These men, however, have made a study of the crop and know their business pretty thoroughly.

Taking the average yield throughout the Province at 175 bushels per acre, then from what has already been said on the cost of production the present price, $27\frac{1}{2}$ c., is certainly not high enough, but if the price were raised, at 30c. it would still be inadequate. But we cannot expect the canners to set their prices so as to ensure even the most slovenly and indifferent growers, producing very meagre yields, a fair profit. Whilst these latter at the present price paid are losing money, as already pointed out, others are reaping substantial profits, and are by no means discontented with existing conditions. As soon as the poor grower clamors for a higher price the canner immediately points to the successful grower as proof that the present price affords ample room for a good profit.

Again, we must admit that the tomato plant is capable of enormous yields, and has been known to yield in the field as high as 1,000 bushels per acre. As early as 1840 the Royal Horticultural Society of London reported the obtaining of over forty pounds of marketable fruit from a single vine. Even as far north as Guelph, this year, from plants not set out till June 10th, and harvesting ceasing on September 30th, twenty varieties were tested and gave from $26\frac{1}{2}$ to $35\frac{1}{2}$ pounds to the vine of good, sound, ripe fruit. Nine plants of each variety were set 5 by 4 feet and no special treatment accorded, and the figures quoted above are an average of the nine plants.

Perhaps it would not be fair to conclude this question without referring to the "risk" which so many growers claim is too great in the production of the crop. They claim that they are so largely dependent on the nature of the season and the length of it, as determined by the dates of early and late frosts. My investigations in the different districts hardly substantiate these claims. Under favorable conditions the tomato plant will develop from the date of sowing the seed to ripe fruit in from 85-120 days of full sunshine, with a constant day temperature of from 75 to 90°F., and 15-20°F. lower at night. Cloudy days and lower temperatures lengthen the period required for maturity in this country to such an extent that the time required is generally from 125 to 175 days, and more generally from 150 to 175. Allowing about forty-five days in which the young plants are being grown, and during which time they may be protected against frost, this leaves us from 100 to 130 days reasonably free from frost, in which to mature the crop. June, July, August and September are generally free from frost. If to this we add the last week in May, it gives us almost 130 days from the time of planting out. This is without counting on October at all. The season in the four districts is amply long, provided the weather is moderately favorable, and the proper attention has been given to the crop. The task of producing

any crop or article of trade might be said to be just as great a risk if marked by lack of proper business methods. I have met plenty of growers who considered the season amply long, and who by seed selection have hastened the maturity of the fruit to such an extent that they always count on delivering their entire crop to the canning factory by the end of September, and this as far east as Prince Edward County.

Again, it is claimed that the contracts are in many cases altogether too favorable to the canner, safe-guarding him to the extent that in the event of a sudden glut of the fruit at the canning factory, combined with a shortness of labor or cans, he has the power to refuse as many loads as he sees fit, in some cases resulting in a loss to the grower of half his crop. Thus the contracts which are worded that the canner undertakes to receive the produce of so many acres, not exceeding 200 or 250 bushels per acre, certainly do not encourage the grower to aim for a heavy yield. Such claims as these, whilst based on actual occurrence, are exceptional, and generally come from the poorer and dissatisfied growers. While the contracts are certainly not worded to safeguard the interests of the grower, yet as a matter of fact they exist only as a formal necessity, and are very rarely enforced. The really good growers are able to practically make their own terms. Quite a number of contracts are made by the bushel, not by the acre, and these are more favorable to the farmer, since if he contracts to supply 1,000 bushels, the amount of land from which he shall produce them rests entirely with him, and thus is a stimulus towards the maximum yield.

There is, perhaps, one more phase which should enter into this question, but which I am not prepared to discuss here, and that is the comparative profits derived from a bushel of tomatoes by both grower and canner. All things considered the growers should certainly receive 30c. per bushel, and if they can obtain this price then they should be satisfied. Those who cannot reap a profit at that price should be content to leave the business to more careful and progressive growers. The chances of obtaining this rise in price in the immediate future are, because of lack of co-operation, not very bright.

SOME POINTS TO BE CONSIDERED IN GROWING TOMATOES, SHOWING WHEREIN LIE THE CAUSES OF FAILURE.

LOCATION: While of considerable importance in the production of the early crop, this consideration does not so largely affect the main crop. Southern slopes and suitable spots affording shelter from too great exposures, as far as is consistent with the rotation, might be taken better advantage of. It is advisable to point out here, that too many indifferent growers are raising their tomatoes five and even six miles from the canning factory, and the long and expensive haul thus incurred, largely affects the cost and profit of the crop. A minimum transportation expense is highly desirable, and should always be aimed at.

PRECEDING CROP.

The consensus of opinion throughout the Province favors clover sod, and this seems to be substantiated by the experience of United States growers, and, speaking in general, the best crops seen this summer were produced on clover sod. However, the choice of the tomato ground to a considerable extent depends upon the rotation of crops in vogue, and one cannot always sow on prepared clover sod. Whilst tomatoes have been grown successfully year after year on the same soil, and I have seen occasional fair crops so produced this summer, the practice is not to be commended, nor is the practice advisable of growing tomatoes on land which was in potatoes the year before, because both these crops are heavy consumers of potash, and considerably reduce the immediately available amount of that element in the soil. Failing a clover sod, the next best will be the second crop after clover, and of the other preceding crops those of a leguminous nature are to be preferred.

CHOICE AND PREPARATION OF THE SOIL.

The best soil is a deep, rich, light loam, over a well drained subsoil. Such a soil gives chances for a maximum yield at a minimum expense, for it contains the necessary fertilizing elements in a readily available state, will drain and warm up quickly after rains, and being light can be cheaply worked, no small consideration in a crop demanding so much labor, and moreover is not so apt to puddle under the frequent cultivations as is a clay. The fault to be found with many growers is that when they are forced to select a soil not as favorable to tomato production as might be desired, they do not attempt to offset the disadvantage by seeking to improve its physical condition, and therefore its available fertility to better meet the requirements of the crop. Good crops can be produced on almost all kinds of soil—but these soils must have good tilth, fertility and drainage conditions, and no matter what the soil, whether light, medium or heavy, unless these conditions exist a large yield will not be obtained. The growers do not study sufficiently the plant they are growing. They do not know its characteristics. The roots of the tomato plant are very short and abundant, and can only gather the essential plant food and water from a very limited area. In contrast, the bean plant, while much smaller than the tomato plant, has an extensive root system, and thus a greater area from which to draw its nutriment. In addition to their shortness, tomato roots are exceedingly tender, and incapable of penetrating a soil in any way hard or compact. A knowledge of these characteristics shows us how essential to success is the proper treatment and preparation of the soil. Avoid soils with much clay in their make-up; unless thoroughly underdrained, they are sure to be cold. I have seen fields of tomatoes which wouldn't begin to pay for the picking—the soils were clayey, poorly underdrained, and heavy rains early in the season had left the young plants standing for

days in inches of water, spelling sure ruin to the crop. The plants thus treated make very little subsequent growth, and their fruits are very small and rot while still green.

CULTIVATION.

Here again, is where a number of growers fall down. The best growers all emphasize the necessity for frequent cultivation, and this necessity can be readily understood when we realize that the period of the active life of the tomato root is short. The young plants, on account of their coarse, open cellular structure, are at first capable of transmitting plant food and water very rapidly, but these transmitting media very soon clog up and lose their activity, hence the necessity for frequent cultivation in the early stages of growth. The most successful growers cultivate four or five times each way during the season, and aim to keep the surface soil in loose friable condition as long as possible. The more cultivation during the two weeks following the setting of the plants the better the results. Since the task of planting out must needs result in compacting the soil to a considerable extent, the first cultivation should take place the next day and be deep and thorough. I have been through field after field of tomatoes where the soil of a clayey nature has been very hard, and consequently the plants were sickly-looking, stunted things.

THE SEED, ITS SOURCE, CONTROL AND SELECTION.

SOURCE: The bulk of the seed comes from the United States. A number of growers select their own seed in a more or less indifferent way. Only two men growing tomatoes for the seed value of the crop were met, Mr. G. H. Clark, at Leamington, and Mr. Maginnis, at London.

The price paid for the imported seed runs from \$1 to as high as \$10 per pound, the general price being about \$3, the duty being 25c. per pound. From two and a half to four dollars per pound should secure good, reliable stock tomato seed. The higher prices are as a rule paid only for the extensive use of printer's ink in vividly portraying their imaginary qualities. Beyond keeping the varieties pure by growing them in separate blocks after a certain standard is reached, no special effort appears to be made by the seed firms with a view to improving and perpetuating their desirable points by selection. A rough estimate places the amount of tomato seed used annually in Ontario at from eight to twelve hundred pounds; thus the market for seed here is very small, and accounts for the importation. . . . Bolgiano & Son, of Baltimore, The Livingstone Seed Co., of Columbus, Ohio, The Burpee Company, the Wm. Henry Maule, Henry A. Dreer, and W. P. Stokes Companies, of Philadelphia, are some of the bigger firms from whom the seed is imported.

CONTROL OF THE SUPPLY: The majority of the factories retain the control of the seed, supplying the farmers at cost price. A few factories, however, leave the farmers to obtain their seed from whatever source they see fit, whilst still a few others grow their own plants and sell these to the contracting party. Some growers select their own seed.

SEED SELECTION: The advisability of the grower selecting his own seed is perhaps questionable. A. W. Livingstone and W. J. Green are decidedly against this practice, their chief reason being, that while the grower may be able to select as good seed as the professional seed grower, yet the amount of seed which he uses is so small that the expense he would incur in producing it himself would be much greater than if



Greater Baltimore.
Jack Roe.

Success.
Earlianna.

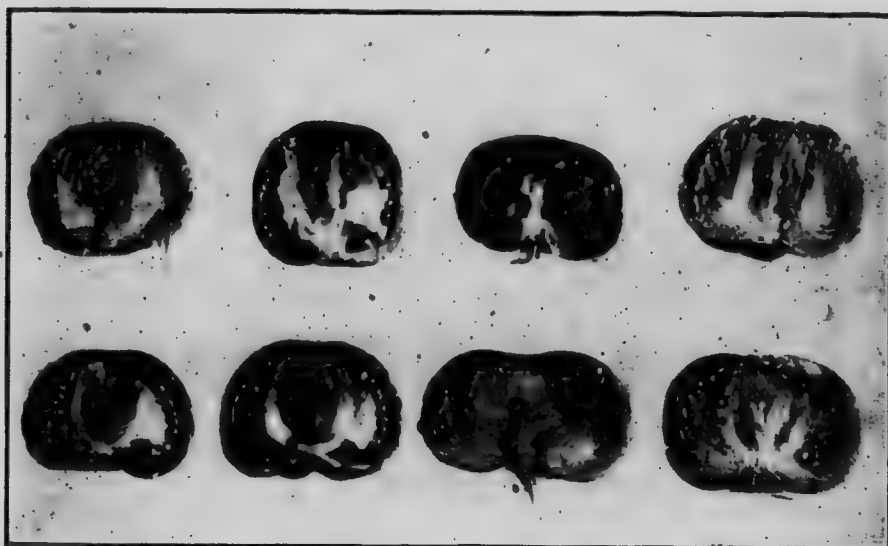
Stone.
Hummer.

B.B.
Coreless.

Cross Sections.

he were to buy the very best selected seed from reputed seed firms. Notwithstanding this opinion, I believe that more of the seed used in this country should be grown here, and that a standard and well carried out system of straight seed selection among farmers is highly desirable, and would materially increase the average yield and profit. The seed selection which is at present carried on to some extent is with very few exceptions far from what it should be. Some few growers will drive up to the canning factory and select for seed purposes individual tomatoes from the crates standing on the platform, without ever seeing the plants they were grown on. Others will select the smoothest, most uniform, and best ripened fruits in their fields without regard to the plants they

grow on. Some go a step further and take the plant, its vitality, amount and uniformity of yield into consideration. But not one grower have I met who has reserved a piece of ground exclusively for seed breeding and attempted to conduct rigid straight seed selection. The best seed selected one year is lost track of the next year. While considerable improvement in the yield, uniformity of size and smoothness of the fruits may confidently be looked forward to from proper selection, yet the greatest return which we may look for is a decided gain in early maturity, a very important factor in view of the shortness of the season. Some growers have already hastened the maturity of their crop some ten days in four or five years by a system of seed selection still open to improvement. Below will be found an outline of a system of seed selection



Greater Baltimore.
Jack Roe.

Success.
Earlianna.

Stone.
Hummer.

B.B.
Coreless.

Longitudinal Section.

aiming at improving the qualities spoken of, and which should be applicable to the case of the ordinary grower.

From the standpoints of soil, climate and market ascertain the type of plant and fruit best suited to your requirements, and keep the type clearly and constantly before you. Presuming that you have a field of tomatoes the seed of which is true to variety and reliable, go through that field and select one or more plants which in every respect approach nearest to the ideal in your mind. Mark these by staking them. Select healthy, productive vines of which the fruit is most uniformly of the desired type, for it must be remembered that the character of the seed is determined by the plant and not by the individual fruit. Thus the

selection of an almost perfect tomato from a plant varying considerably in size and perfection is not advisable. The fruits selected should be large, but not abnormally so, the earliest to mature, smooth and well shaped. When the fruit is thoroughly ripe, but not till then, it should be picked and the seed extracted as follows:—

Cut the tomatoes in two crosswise; slip out the seed-pulp into a pail or tub; let the pulp stand twenty-four hours, then put in plenty of clean water; stir and break up the sour pulp until all the good seed will settle to the bottom, when left to stand a minute; pour off the top, then put in more water, going through the same operation again and again until the seeds settle in nearly clean water. Now drain off all the water you can; place the seed in a towel, and press out the surplus water; they are then ready to spread out in the sun or some warm place to dry. Stir them up occasionally until they are thoroughly dried. In putting them away see that they are in a place safe from mice. Label the seed plainly, recording the day of the month and the year when it was saved, and moreover, keep the seed from each plant entirely separate.

Supposing that five plants were selected. The following spring the young plants raised from the seed thus saved should be set out on a well prepared piece of ground, kept entirely separate from the main crop, taking care to keep the progeny of each plant separate and to set it in separate blocks. Label these blocks plainly, and as the plants grow compare them with the original plant from which they come and with the type in view. Select that block in which all the plants come nearest to the desired type, and which show the least variation. From that block the best plants are selected, discarding for further selection purposes all the other plants in the whole breeding patch. Such a course of selection should not be hard to carry out, and if judiciously and carefully done should in from three to five years result in strains of seed greatly superior and better adapted to one's own conditions than any which it is possible to purchase. The seed from the discarded plants may be used for the main crop, as it will be of a superior nature to that purchased.

PRODUCING THE YOUNG PLANTS.

This is where one of the biggest causes of failure lies. When the plants are grown by professional growers they are often held back or suddenly forced to meet the grower's requirements, and through rush of business and lack of space are not properly hardened off. Where one grower is raising two hundred thousand or two hundred and fifty thousand plants, the space and appliances at his disposal are too often inadequate, and the attention which would be given to a smaller number is not applied, with the result that the plants are not as hardy or stocky as they should be. Many farmers are starting their own plants successfully, but in too many cases there is great room for improvement in the construction and make up of the hot beds and cold beds, and also in the management of the growing plants. I should like to be able to give

more definite knowledge on this important phase of the business, but as the summer was already well advanced when the investigation commenced I was not accorded the chance to study the question. It is an essential of profitable production that good hardy, stocky plants be procured for setting. By the last week in May they should be from six to eight inches high, the stalk about the thickness of a lead pencil, and of a dark purple color and the root system well developed. It is essential that these plants be kept growing, that is, transferred to the field with the minimum amount of check, for any check that the tomato plant receives will always result in a reduction of the fruit, although the check may not be apparent in the foliage. Those spindly, light colored plants that are all stem, and seem, so to speak, up in the air, should be shunned. It is a sheer waste of time and money to endeavor to raise a crop from them. Below will be found a description of the hotbeds and cold frames, together with other apparatus necessary for growing the plants required for a five acre patch. I have endeavored to describe those most suitable for the farmer growing from one to five acres of tomatoes for the canning factory. General directions are given for growing the young plants, and these, of course, must be modified to suit the conditions and requirements of the individual.

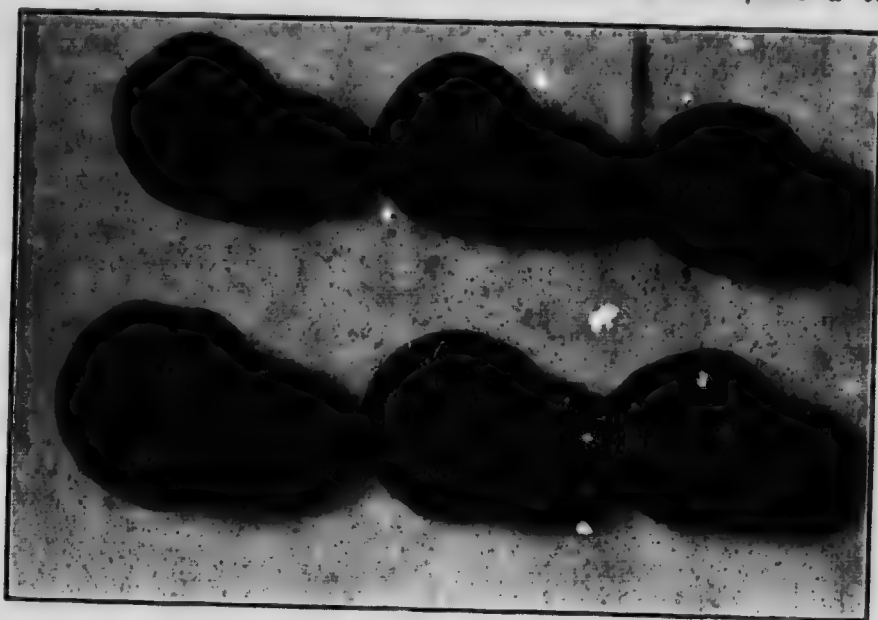
THE HOTBED.

In locating hotbeds choose a warm sunny spot, dry and well drained, with as great a protection as possible from the north or northwest winds, a southerly slope being desirable. Let the land selected be some 30 yards long and 10 or 12 feet wide, and running east and west.

A hotbed frame of sufficient size to carry three 3 x 6 foot sash, that is, 9 x 6 feet, will enclose space enough in which to start the plants necessary for a five acre field of tomatoes. In the middle of the strip of land selected, remove the soil to a depth of one foot for a space of two feet larger each way than the size of the frames, that is, 11 x 8 feet. Now build up this space squarely with manure to a height of two feet. Fresh horse manure from grain fed horses without too much litter should be used. Uniformity of composition and in heating must be had if uniformity in growth is to be secured. This may be accomplished by shaking out and evenly spreading each forkful of manure and repeatedly and evenly tramping it down as the bed is being built up. The frame can now be placed on the bed of manure. It should be 10 inches high in front and 16 inches high at the back. If the back be made of two boards, let one of them be narrow and placed at the bottom so that the crack between them can be covered by banking up with manure or earth. Set the frame on the bed, first placing four short pieces of board under the corners to ensure even setting in the manure. Now complete the hotbed by placing on a top layer, six inches deep of light, rich friable soil. A soil composed of about three parts of garden loam, two parts well rotted stable manure, and part of an equal mixture of sand and leaf mould, is desirable.

THE COLD FRAMES.

The young plants started in the hotbeds are to be pricked out into these. They may be of the same dimensions as the hotbed frames, and for convenience should be placed on either side of the hotbed, and adjoining it for a distance of 36 feet, giving space enough to hold, pricked out to four inches apart, all the plants which can be started in the central hotbed. The soil underneath the cold frames for a depth of eight inches should be removed and a five inch layer of well rotted stable manure placed in. This manure should be dry enough so that it will not become pasty when tramped into a firm level layer, and sufficiently rotted that it will not heat. On this place a four



Stone.

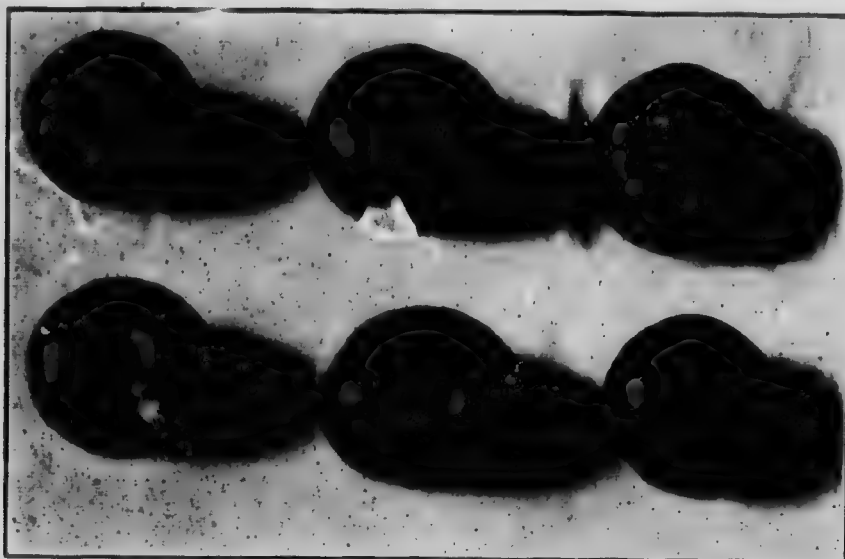
Bolgiano's Best.

inch layer of the soil described above. Although cloth curtains often replace sash as a covering for these cold frames in more southerly climates, yet for this Province the sash had better be used.

DIRECTIONS FOR GROWING THE PLANTS.

We now have a hotbed located centrally in the middle of the cold frames and containing some 54 square feet, upon which we are to start plants enough to set five acres. First, thoroughly level off the soil upon which the seed is to be sown. About the first week in April sow the seed in drills $\frac{1}{2}$ inch deep and 3 inches apart; seven or eight

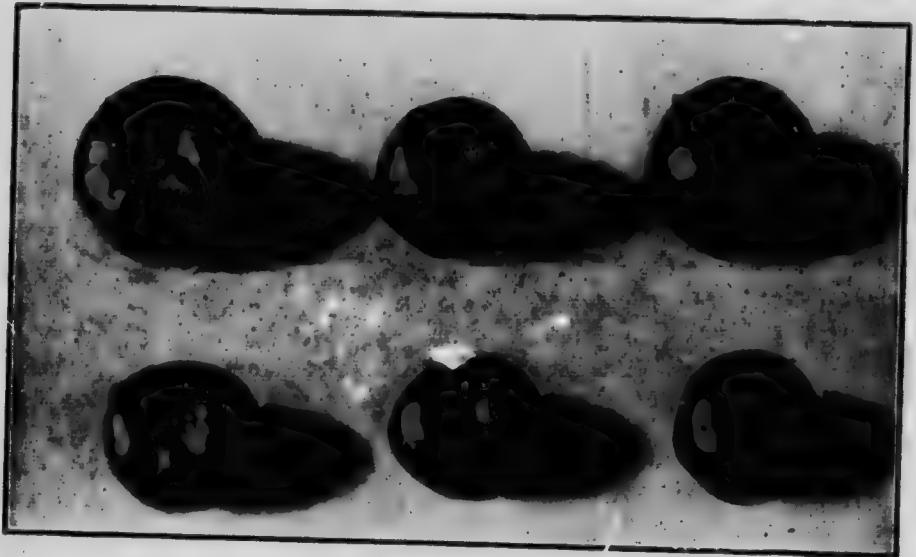
seeds to the inch. Now scatter over the surface an equal mixture of leaf-mould and lake sand and press firmly and evenly over the seeds. This covering will not bake or crust, and the tender shoots of the germinating seeds can much more readily break through. If the soil is dry, sprinkle lightly with tepid water and replace sash, partially shading the same. We now have some 36 rows 70 inches long and sown eight seeds to the inch, or a total sowing of over 20,000 seeds, which should give us enough plants for our purpose. It will take from three to six days for the plants to break soil, and the temperature during this period should be from 75 to 85°F. in the day time, and from 55 to 65°F. at night. When the plants have practically all broken through remove the covering from the sash and reduce



Success.
Greater Baltimore.

the temperature to from 70° to 80°F. The temperature can be regulated by dropping open the sash. After about ten days reduce the temperature to from 65° to 70°F. and give more air. Dull, cloudy weather, too high a temperature, crowding of the plants and insufficient ventilation, causes damping off. Great care must be taken not to over supply the young plants with water, as this will also cause damping off. Endeavor to keep them growing thriftily, with as little watering as possible. Some authorities favor two transplantings, and others only one. The system here recommended is a combination of the two. As soon as the central bud is well started prick out the plants to the cold frames, setting two inches apart. Remove the plants as carefully as possible, preserving the root system intact, and set them a little

deeper than they were in the hotbed, pressing the soil tightly around them, so that they cannot be easily pulled out. To prevent excessive wilting, shade the young plants for the next few days. Don't apply any more water than necessary, and be sure that it is tepid. As soon as the plants are well established in their new positions admit as much light as possible, being careful that the temperature does not fall below 45°F., and that the plants are not subjected to cold winds. As soon as the plants begin to crowd one another transplant every other plant, setting them four inches apart; this will leave the whole lot four inches apart, half of them transplanted twice and the other half only once. When set in the field those transplanted twice will probably bear the first ripened fruits, and those transplanted once will follow shortly. Be careful not to over-water the plants or expose them



Jack Roe
Earlanna.

to unfavorable winds, and maintain a uniform temperature throughout the day of from 60° to 75°F. Observe these precautions, and by the time that it is safe to set in the open field you should have good, hardy, stocky plants, which, with subsequent favorable attention and conditions, will produce a heavy crop.

A very convenient article to have when transplanting is a spotting board. This may be about 5 feet 10 inches long, one foot wide, with round tapering fingers, about one inch in diameter at the base, and 2½ inches long. These should be fastened into the board the distance apart the plants are to be set, in this case 4 inches. It should also have narrow projections carrying a single peg nailed to the top of the

board at each end, so that when these pegs are placed in the end holes of the last row, the first row of pegs in the spotting board will be the right distance from the last row of holes or plants. By standing on the spotting board while setting plants in one set of holes, holes for another set are formed. The cost of the frames and sash recommended need not exceed \$75, and might be considerably less, and they may be turned to advantage in many ways when not occupied by the young tomato plants.

THE USE OF BARNYARD MANURE AND COMMERCIAL FERTILIZERS.

The nature and amount of fertilizing elements to be applied to the soil is dependent upon such a number of local conditions that no one individual can recommend a certain practice and guarantee success to all those who follow it. The more growers one sees the greater the variety of practices and the differences of opinions that one meets with. In general, the application of barnyard manure is not heavy, from 8 to 10 tons of well rotted stuff to the acre. In southern Ontario, to a lesser extent in western Ontario, and to a still less extent in eastern Ontario and Prince Edward County, this is supplemented with from 200 to 500 lbs. of commercial fertilizer, 2-8-10 generally, worked in around the plants at the time of setting. A relatively large per cent. of potash and small per cent. of nitrogen is desirable, since a large proportion of nitrogen will cause the plants to run to vine and lessen the yield, while potash tends to produce smaller vines and a better all round quality of fruit. The grower must strive to ascertain what his soil needs and aim to supply that need. The results with fertilizers have been so variable that I cannot make any general recommendation as to their use. Many growers in southern Ontario, however, would not think of doing without them, and they are more or less used in the other districts, yet many growers have no use for them. The grower must determine the actual value of these fertilizers to his soil by experiment. It can never be done by theory. Suffice it to say, that many growers would get heavier crops if they prepared their ground better, paid more attention to cultivation and used less fertilizer.

FUNGOUS DISEASES.

In this respect the tomato crop is very well favored, for compared to the potato and other crops, the yield is very little affected by the ravages of insect pests or fungous diseases. Of all the poor yields and backward fields of tomatoes seen, not one was due in the main to either of these two causes. Leaf Spot (*Septoria lycopersica*), commonly called blight, produces small, roundish, dark brown spots on the leaves and stems, and occasionally on the fruits. The lower portion of the plant is attacked first. Leaf spot was met with occasionally, but always very light, and never spread to any extent until the plants were

well advanced and well loaded with fruit. Sometimes towards the end of the season it spreads rather rapidly, but as the plant by that time has set all the fruits the remaining length of the season will ripen, the effect is hardly detrimental, often helpful, by decreasing the foliage, thus exposing the fruit to sun and ripening it up more quickly.

BLIGHT (*Bacillus Solanacearum*), a bacterial disease, turning the stems and leaves brown and black. Less prevalent than the leaf spot. Both these diseases are referred to by the bulk of the growers as blight, no distinction being drawn between the two.

REMEDIES. As already stated these diseases have not been prevalent enough in the province to cause any alarm. Thorough cultivation inducing vigorous, healthy growing plants with frequent changes of the land will probably eliminate trouble from this source. Spraying with Bordeaux mixture is recommended by plant pathologists, but is generally considered impracticable, owing to the labor necessary to do the work well. If resorted to it should be conducted as follows:—

1st. Spraying while the young plants are still in the seed bed a few days before transplanting.

2nd. Spraying, a week after the plants are set in the field.

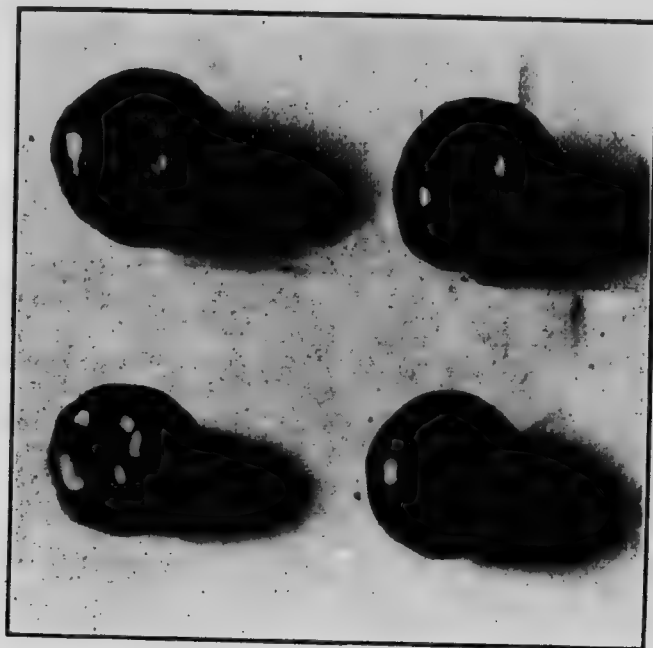
3rd and 4th. Spraying at intervals of two weeks. If needed a fifth spraying two weeks later. The work should be done thoroughly, every leaf being covered with a fine mist. Spray while the plants are still healthy.

POINT ROT OR BLACK ROT OF TOMATO. It occurs on the green fruit at various stages of its development. The germs causing the disease often lodge at the blossom end of the fruit when it is very small. It begins as a sunken brown spot and gradually enlarges until the fruit is rendered worthless. The decayed spots are often roundish and covered with a dense black velvety growth (*Macrosporium tomato*) which was formerly thought to be the cause of the rot, which has since been proved to be only a saprophyte. This disease is met with in small quantities over the Province, is not serious, but is often confounded with anthracnose or the ripe rot of tomatoes. Dry weather and light soils with insufficient moisture supply favor the prevalence of Black Rot. Spraying will not control it. Thorough cultivation and change of land will help. Gather up all the diseased fruit and burn it.

ANTHRACNOSE—RIPE ROT (*Colletotrichum phomoides*). This disease is distinguished from black rot by the fact that it occurs on ripe or nearly ripe fruits, and produces a soft, rapid decay. It is greatly favored by damp, rainy weather. It is commonly met with, in a few cases causing considerable loss. It is more prevalent in varieties that grow a heavy, close vine and will be found among the crown fruits and those resting on the ground, the exclusion of light and air tending to conditions favoring its growth. The remedies suggested for black rot should be used in this case. When gathering the first pickings instead of leaving these anthracnose infested fruits where they lie they

should be placed in a separate basket and destroyed. Avoid as far as possible varieties that grow excessively heavy and dense vines.

CUTWORMS. A considerable amount of trouble and loss has been caused to tomato growers in the province, more particularly in the eastern Ontario and Prince Edward County districts, by the ravages of various species of cutworms. In the two districts just mentioned often 25, 50 and even 75 per cent. of the plants have had to be reset, so great have been the depredations of the pest. No description of these insects and their methods of attack is necessary as growers are as a rule quite familiar with both of them. Strange to say, with a few exceptions, the growers have made no effort to fight this pest, beyond



Coreless.
Hummer.

continual resetting which involves considerable additional labor and expense, and the reset plants are always behind. Those who have given a fair trial to the poisoned bait remedy have done so with much success. In the whole list of remedies for insect pests the poisoned bran mash has been one of the most effective, and it is to be regretted that such a cheap, easily applied and successful treatment as it has proved to be is not more generally used. In order to get the best results from the use of this bait the following precautions in preparing and applying it should be observed.

Procure a bushel box or large soap box and place 25 lbs. of bran in it. Moisten with half a pail of water thoroughly diffusing the moisture throughout the bran. It is better to have the bran under moistened rather than over moistened. Dissolve 3 lbs. of sugar in half a pail of water and add this in the same way. The right amount of water has been added when the bran is moist enough to cause the fine particles of Paris green to adhere to it and when it crumbles easily and runs through the fingers without adhering. Now take $\frac{1}{2}$ lb. of Paris green and dust a portion of it over the surface of the bran. Stir the bran up thoroughly. Repeat this process until the whole $\frac{1}{2}$ lb. of Paris green is thoroughly disseminated through the 25 lbs. of bran. If the Paris green is added to perfectly dry bran, owing to its weight it will sink at once to the bottom when stirred, in the same way that it does in water. Until ready to use place the mixture in a cool shaded spot. The land upon which the crop is to be grown should be kept free from all vegetation for two or three weeks previous to planting. This renders the cutworms hungry, and they will eagerly attack the poisoned bait when it is applied. The bait should not be applied till after the sun has gone down. If applied in the day time the heat of the sun dries out the mixture, and it loses some of its sweetness and is less attractive. The first application should be made in the evening of the day the plants are set out and subsequent applications during the next few days at the grower's judgment. When applying, sprinkle just a little close to the stock of each plant. Fifty lbs. of bran with one pound of Paris green, thoroughly sweetened and prepared as above described will cover one acre and can be applied in two hours, so that this remedy is much cheaper and more satisfactory than resetting. Wherever a plant is cut off, the worm is sure to be quite near the root and should be dug out and destroyed. Clean farming will also help by destroying many eggs and preventing the deposition of others.

FLEA BEETLES AND COLORADO POTATO BEETLE. A number of complaints were received of these insects, more particularly the Colorado Potato Beetle, feeding on the foliage of the young plants soon after they were set out. Spraying with Paris green 1 lb. to 100 gallons of water, or with 1 lb. of Paris green to 100 gallons of Bordeaux mixture whilst still in the cold frames and another spraying three or four days after planting is effective.

THE TOMATO WORM. A large green colored worm about three inches long feeding on the foliage seldom met in numbers large enough to do serious damage. On account of their color being almost identical with that of the plant, they are somewhat hard to see, but a little experience will readily help one to detect their presence, and they can be held in check by hand picking.

VARIETIES.

There are a great number of varieties of tomatoes grown throughout the province and I make no attempt to recommend particular ones for each district. There are, however, certain varieties commonly grown in each district which have given general satisfaction both to the canner and grower, and one is fairly safe in choosing any one of these. Ignotum Matchless, Worden, Greater Baltimore, Perfection, Success, and for a fairly early tomato Chalk's Jewel and selected strains of Earlianna. Stone, although a good yielder and an admirable variety from the canner's standpoint, is apt to be a little late and often a portion of the crop is caught by frost. Selection with a view to early maturity would produce a very valuable strain of this variety. Chalk's Jewel is apt to run off in size, and Earlianna after the first picking falls off in quality of yield, the fruits not ripening up well at the stem end, thus causing a waste to the canners. Both these varieties may be rendered still more valuable by judicious seed selection.

TOMATO CATSUP.

I failed to obtain any reliable estimate of the amount of whole tomatoes and tomato pulp manufactured into catsup; comparatively few factories put up pulp for this purpose. There is much concerning the produce from which this catsup is made, and the way that it is handled that is open to criticism and improvement. In some canning factories the tomato slop and peelings lies for some time in open receptacles, and in some cases sours and almost decomposes before being boiled down into pulp and finally converted into catsup. In too many cases the same cleanliness is not observed in handling the material that is converted into pulp as is observed in packing the tomatoes. The bulk of the canning factory tomatoes are of the solid meaty varieties and do not contain over-much juice and acid. On the other hand the finest tomatoes for catsup are those containing the greatest amount of acid and juice and less meat, which three qualities go together. Such tomatoes are not often produced in canning factory districts, and the rough product from which the catsup is made consists of refuse from all sorts and conglomerations of tomatoes, and hence the poor quality of the final product. The Earlianna is a variety of superior flavor and valuable for good catsup making.

PROBABLE EXTENSION OF THE BUSINESS.

There were packed this year in the Province of Ontario in the neighborhood of 21,000,000 cans of tomatoes, or about $3\frac{1}{2}$ cans to each head of the population in the Dominion. This fact would seem to

indicate room for extension of the business, but this extension largely depends on the quality of the goods put before the consumer. There never has been a time when strictly first class canned tomatoes were packed in excess of the demand. There may have been a time when the market was overloaded and injured by second class goods. The condemnation or approval of the masses who purchase these goods directly affects the supply and demand. If the consumers had implicit confidence in all canned goods, and those canned goods were strictly first-class, then the demand would be much greater than it is at present, and the possibilities of the canning industry would increase very materially. However, in this respect it would be well to remember that the canning factories in Ontario are by no means run to their full capacity, and that if there were, without increasing their number they would be able to supply a much greater demand than they do at present.

TOMATO REFUSE.

As already stated many factories do not put up pulp at all, and those that do still have a certain amount of refuse on their hands, so that all the factories have tomato refuse to dispose of. In a number of cases it is drawn away by growers to be used for pig feed. If not fed in too concentrated a state it proves of value. Used in large quantities and without mixing any other foodstuff with it, it is decidedly dangerous on account of its acidity. In other cases it is drawn away and spread on the land for its fertilizing value, on which there is considerable difference of opinion, some claiming to have used it with a fair amount of success, while others do not consider it worth the time it takes to draw it to the field. The majority of it is disposed of in these two ways. However, in a few cases it is drawn away to some dump nearby—a most objectionable practice. Where factories are situated on the banks of a creek or river, the refuse is dumped straight into the stream and is carried away by the current, and many bitter complaints of such a practice have been made by nearby farmers who depend upon the water thus contaminated as a drinking supply for their cattle. There is room for investigation and experimental work as to the feeding and fertilizing value of this and other canning factory refuse, and certainly room for improvement in the legislation controlling its disposal or in the enforcement of that legislation.

OTHER SPECIES.

Cherry, pear and plum tomatoes are grown to a very limited extent to be used in making preserves and sauces. They will be found on the markets from August 1st to October 15th, at prices from 60 to 75 cents per 11 quart basket.

EARLY TOMATOES.

EXTENT OF THE INDUSTRY IN ONTARIO.

The production of early tomatoes to supply the demand before the first of the main crop matures has assumed considerable proportions in the more favored districts, namely, the Niagara peninsula, the Leamington district in Essex County, and the neighborhood of Toronto, and is carried on to a lesser extent throughout the tomato growing sections of the Province.

The summer was already well advanced when the investigation commenced, and this fact, coupled with the great extent of the area to be covered, and the large number of canning factory districts to be visited, rendered it almost impossible to pay any attention to this portion of the industry. In this respect another deterring element was that the investigation commenced in the eastern portion of the Province and the really early sections were not reached until the close of August, when the early crop was well over and the main crop coming in.

In the United States it is claimed that the amount of tomatoes annually put on the market in the fresh state is equal to the amount put up in cans. There is, however, no definite reliable information on this point, but certainly the amount sold in the fresh state in Ontario and the North-West is far below the amount taken by the canning factories. In the States the tomato is produced out of doors almost the whole year round, and doubtless the production of the great truck growing regions of the South considerably helps to swell the amount marketed in the raw state, in that country.

While in this country a large number of tomatoes are consumed in the fresh state, all the time the main crop is maturing, yet these cannot be classed as early tomatoes, the season for which may be said to extend only from July 1st to August 15th.

In the Leamington district, including Kingsville, Ruthven, Essex Centre, and Windsor, the total shipment during the above mentioned period, exclusive of those consigned to Winnipeg would approximate to 40,000 eleven-quart baskets. Of the extent of the shipments in the Niagara and other districts, I have no information at all reliable. The task of collecting information on this point is complicated, and necessitates the thorough co-operation of the express companies and wholesale fruit and vegetable produce handlers. An examination of the express companies' shipping bills at the individual stations is not altogether satisfactory, as the consignments are often mixed and merely recorded on the bill as so many baskets of fruit, the actual amount of each product not being specified. Also between July 1st, and August 15th, a considerable quantity of tomatoes are placed directly in the hands of the retailers throughout the Province by the growers themselves.

MARKETS.

The majority of these early tomatoes are marketed throughout Ontario, the bulk going to the principal cities and towns. The amount shipped to Winnipeg is not known, the consignments being mixed. The Essex growers claim that the Western trade has not proved satisfactory as the first shipments by express are expensive and compete with the American grown product. Later on in the season when they are shipped in bulk much cheaper by freight, for some 60 cents per 100 pounds, they come into competition with the St. Catharines tomatoes, and the prices do not hold up well. Also they are not handled in Winnipeg to the best advantage of the grower, the jobbers taking too large a share of the profits. It seems that in this respect there is room for improvement in the selling organization for the Western markets.

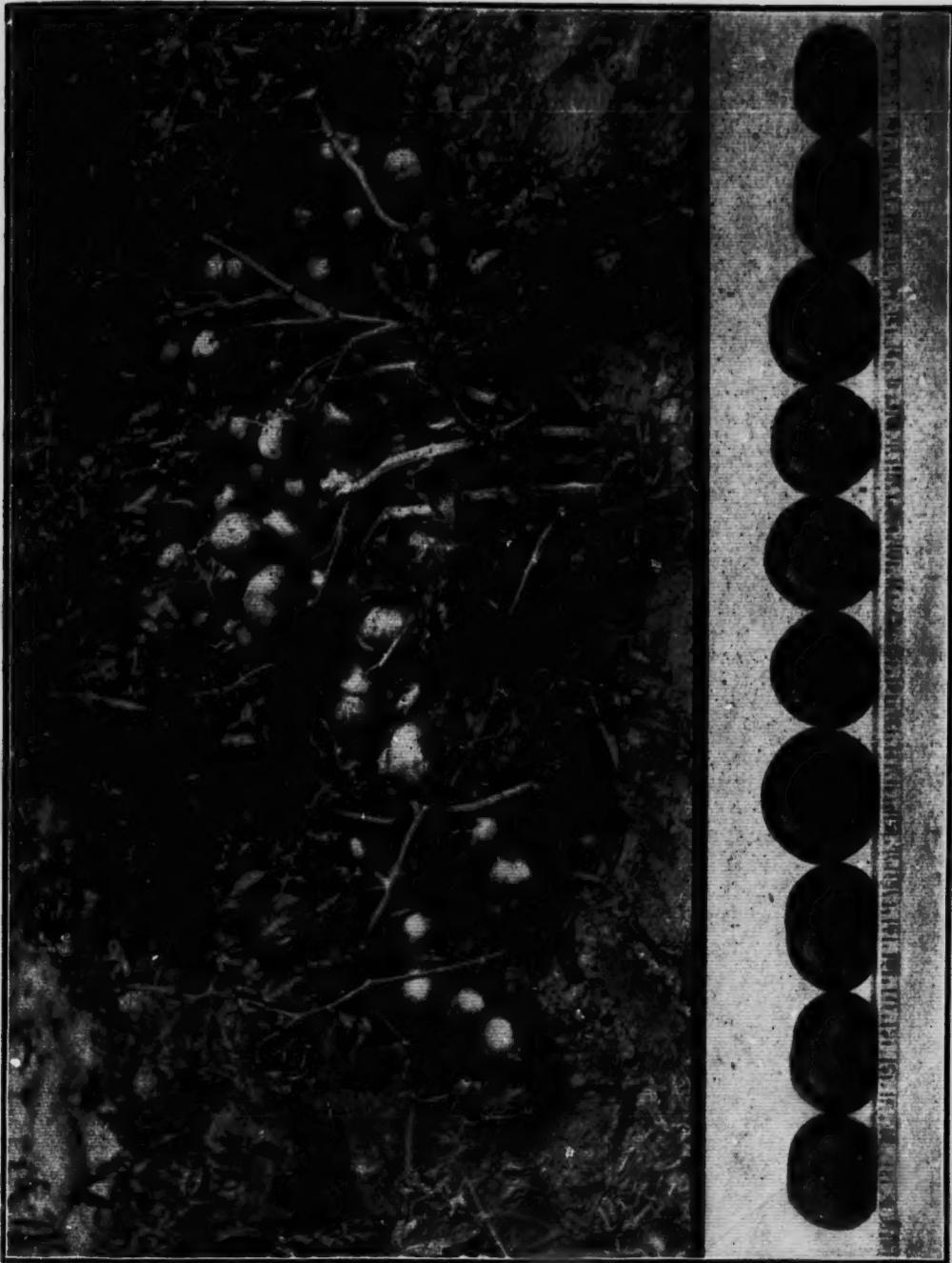
CULTURE.

The culture of early tomatoes is in the main, the same as for the canning crop, the greatest difference being in the growing of the young plants.

The seed is sown from February 20th to March 1st. The number of transplantings is more than in the case of the main crop, often as many as four, the last two transplantings into cold frames, the final transplanting being to six and even seven inches apart. At the time the plants are set in the field they will be some fifteen inches tall, with a spread of an equal distance, and bearing small tomatoes. The time for setting out varies with the districts, from the 4th to the 10th of May in the Essex district, somewhat later in the Niagara peninsula and points further east. The plants are generally set 5 x 4 feet in the field. The first picking will be about July 1st and the bulk of the crop will be matured by the middle of August.

COST OF PRODUCTION.

The great difference between the cost of producing the main crop tomatoes and early tomatoes lies in the increased expenditure incurred in the growing of the young plants and in the marketing of the final product. None of the early tomato growers with whom I came into contact had kept any record of the cost of production, chiefly because the young plants are grown in greenhouses along with other produce and the task of apportioning the various items of expenditure to each crop was a difficult one. They were, however, unanimous in placing the cost at from thirty-five to forty-five dollars per 1,000. The land suitable to the production of these early tomatoes in these more favored sections of the Province is considerably higher priced than that used for producing the main crop, and the rent item is therefore increased from seven to ten dollars per acre. The tomatoes being marketed in



Chalk's Jewel Tomato.

eleven-quart baskets also renders the cost of production higher. Taking these facts into consideration the total cost of production per acre will probably range from \$175 to \$200. The expense of picking, cleaning and packing the tomatoes into eleven-quart baskets is as mentioned heavy and therefore a light or heavy crop would make a considerable difference to the total cost of production.

PRICES.

The prices for first picked fruit will run from \$1.50 to as high as \$2.00 and \$2.25, dropping to \$1.00 per basket by the middle of July. By the end of that month they will be down to 70 cents and by the middle of August, will be selling as low as 30 cents per basket.

VARIETIES.

The Earlianna and Chalk's Jewel were the only two varieties I met with being used for this trade. Of these the Earlianna is earliest and more generally used.

T. DELWORTH: I would like to know what a man pays for his labor, if he gets the work done for \$60 an acre?

A. G. TURNEY: That is a question upon which there is a great deal of dispute, because a lot of men do not want to count in their own labor. If they estimate the labor of a man and team, they do not figure it out at the price they would have to pay if hired.

T. DELWORTH: That is where a great many vegetable growers fail in not estimating the proper price of their own and hired labor. If you should use twenty tons of manure an acre; it will cost you at the car \$20, and it has to be hauled from the car and spread on the field ready for plowing under. If the field is three miles from a station, how many tons will an ordinary man with a team of horses spread on the field? It is worth an additional dollar to haul it.

A. W. PEART: It is worth \$4 for six tons.

T. DELWORTH: That is seventy cents a ton to deliver or \$34.00 an acre for the manure to start with.

A MEMBER: You should not charge that whole cost to a single crop.

A MEMBER: The market gardener would not be satisfied unless he applied that each year.

A. G. TURNEY: Take twenty tons to the acre; the gardener who takes that from his barnyard would not estimate it at more than 50 cents a load.

E. E. ADAMS: Does Mr. Delworth put on twenty-five two horse loads per acre, every year.

T. DELWORTH: I do not make a practice of planting tomatoes year after year on the same land.

E. E. ADAMS: I am told by a gentleman that he has raised eighteen crops from the same soil year after year and the last crop was the best.

MR. McCALLA: I might make this statement, with regard to the cost of producing, that it depends upon one's local conditions and upon the way in which things are estimated. I want to say that I heartily approve of what Mr. Delworth said with regard to the estimated cost to the farmer of teams and labor. We have to feed our teams in winter and on rainy days and on Sunday, and unless we can get a pretty good price for our teams when actually working, we shall go behind, and we could not afford to keep teams for very much less than the man in town. We must not expect to work ourselves for less than the hired man gets, so that we ought to charge up the full cost of labor in every case. We figure it out in St. Catharines that a 400 bushel crop of tomatoes would cost to grow and deliver between \$70 and \$75 per acre.

As far as the manure is concerned, I would not if I could, put 25 tons of manure on any soil in ordinary good condition, and then plant tomatoes in it, as I would get too much top. Fertilizers have received such hard treatment here that I want to give you a statement of actual facts. I had a piece of land that was in peaches for five years. It received some commercial fertilizer and wood ashes and no stable manure. Two crops of clover were plowed under. We pulled out the trees and put on twelve spreader loads of fresh manure to the acre, that would be twelve tons. I planted it to corn and followed the corn with potatoes, using no manure but applying 600 pounds to the acre of high grade home mixed fertilizer. After the potatoes I had a good crop of wheat; sowed clover with the wheat and when the clover was seven or eight inches high, I turned it under and planted peaches again, and between the peach trees I planted tomatoes. That land had no manure since 1905, and I grew this year, if we count the actual land occupied by the tomatoes and not allow anything for head lands and drive ways, on four acres, 695 bushels to the acre, and if we allow for head lands and driveways, I had 600 bushels. It is all right to say twenty tons to the acre on certain land, but I think commercial fertilizers are a good deal better and safer. Manure costs us about \$2 a ton put on the field.

A MEMBER: What do the farmers in your neighborhood value their land at?

W. J. McCALLA: \$150 an acre.

T. DELWORTH: Our land is so valuable that we cannot plow under clover. A great deal of the land used around here for market gardening is worth double what Mr. McCalla estimates his land at.

W. J. McCALLA: What will suit one locality will not do in another. The land on which I am growing tomatoes is worth from \$200 to \$250 an acre, and I would not have manure put on, if you drew it and put it on free. We plant tomatoes where we have grown musk-melons the previous season, and we have put on seven or eight tons to the acre for musk-melons.

T. DELWORTH: My crop for last year was slightly over $\frac{3}{4}$ of an acre, and we harvested over 600 bushels, and one-half of them was the Earlianna.

A. G. TURNEY: If we take Mr. McCalla's estimate of the cost as \$75, that would leave only a profit of \$15 if you only produced 300 bushels, but most men produce at least 400. Would you consider a profit of \$50 an acre a fair return where it is almost a farm crop?

T. DELWORTH: A very small return to a market gardener who has to make a living off of five acres of land.

F. G. FULLER, LONDON: Some people have said that they can get land too rich for tomatoes. I admit that may be so for a late crop, but for an early crop I think it is absurd. If you don't have your plants well grown when you put them out then your ground can be too rich, but if your plants are early and you have some fruit on them when you set them in the ground you cannot have it too rich, even if it is one-half manure. Last year we put some out and forced these plants to the first of June, 3,000 plants to the acre, and from one acre we received between \$500 and \$600. The Dwarf Champion is not a large cropper, but we cannot get our land too rich for it.

A MEMBER: In my opinion we are running on two lines. I look upon the question of growing tomatoes for the factory a separate question altogether from growing them for the market.

JAMES GUTHRIE: Don't you think it is necessary for the market gardener to know what he is getting? I am one of the oldest gardeners in the room, and I have had a good deal of experience. I grow for the Toronto trade. I pay my taxes to the City of Toronto and they amount to about \$300 an acre, and I have made a good living on 10 acres and raised a family of eleven. How could I make a living growing tomatoes, if I only realized \$50 or \$60 an acre of profit? It cannot be done. I grow an immense crop. I have greenhouses and grow flowers and vegetables, and a man has to work carefully in the City of Toronto to make a good living, even if he did not have to pay taxes. Some men have advocated manuring very highly for tomatoes. I have grown them for thirty-six years. I do not put on one ounce of manure for them, but I manure highly the previous year for another crop. Where I grow potatoes this year. I plant my tomatoes next year, and I have sold them on the market for 25 cents a quart. If I manure my tomatoes the same as some have suggested, I would have them all tops. I do not manure the Dwarf Champion, because it does not grow too quick. You can plant Dwarf Champions a foot apart every way and walk between them.